

Requested Patent: GB1078650A

Title:

SURGICAL OR VETERINARY TUBING CONTAINING A FLOW CONTROL VALVE ;

Abstracted Patent: GB1078650 ;

Publication Date: 1967-08-09 ;

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Applicant(s): ESCHMANN BROS \_WALSH LTD ;

Application Number: GB19640035742 19640901 ;

Priority Number(s): GB19640035742 19640901 ;

IPC Classification: ;

Equivalents: ;

ABSTRACT:

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# PATENT SPECIFICATION

DRAWINGS ATTACHED

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*Date of filing Complete Specification:* Aug. 18, 1965.

*Application Date:* Sept. 1, 1964.

*No.* 35742/64.

*Complete Specification Published:* Aug. 9, 1967.

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*Index at acceptance:*—F2 V (E1L2, L7X); A5 R(45, 62)

*Int. Cl.:*—F 16 k // A 61 b

## COMPLETE SPECIFICATION

### Surgical or Veterinary Tubing Containing a Flow Control Valve

We, ESCHMANN BROS. & WALSH LIMITED, a British Company of 22—25, Bartholomew Square, Old Street, London, E.C.1., do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention concerns surgical or veterinary tubing containing a flow control valve through which air, water, and other liquids or gases are passed under delicate control. It is applicable to catheters, tracheotomy tubes and cuffs, and armoured tubes, and in general flexible surgical and veterinary tubing for insertion into the body through an orifice and fitted with an inflatable balloon to hold it in place. The invention is particularly applicable to Foley catheters. Such catheters are made of flexible material such as rubber latex or polyvinyl chloride, and comprise two substantially parallel tubes: a drainage tube and an inflation tube, the latter normally lying within the drainage tube and terminating in an inflation funnel at one end of the catheter and an inflatable balloon of flexible elastic material, such as rubber latex, at the other end. In order to inflate the balloon a hypodermic syringe is inserted into the inflation funnel and sterile liquid or gas is forced from the syringe through the inflation tube into the balloon.

The invention will be described with particular reference to catheters, but it is to be understood that it can be applied generally to surgical and veterinary equipment of the type specified.

The inflation funnel is of course kept sealed until the liquid or gas is to be sent through the catheters: three methods of sealing this funnel are used conventionally.

The first of these involves closing the funnel with a rubber or like plug. In order to break

this seal it is necessary to perforate the plug with the needle of the hypodermic syringe containing the sterile liquid. Inserting the needle through the plug involves a rather large manual force and can result, particularly in the hands of inexperienced operatives, in the needle going astray and either damaging the tubes or injuring the operator or possible the patient.

The second method of sealing involves clamping the inflation funnel with a surgical clamp but this has the disadvantage that in order to avoid or minimize leakage, the clamp must be fastened tightly and this can damage the latex or other material that the catheter is made of.

The third method of sealing involves the use of a non-return valve inserted in the inflation funnel. While this provides a tight but readily broken seal and thus overcomes the disadvantage of the plug and the surgical clamp, it is an expensive construction consisting of four separate precision-made parts. Furthermore, the outside is not made of rubber, and when the catheter is rubber, ribs or the like are required to firmly attach the valve to the funnel. A non-return valve of this type cannot moreover be used with a hypodermic syringe fitted with a needle because the needle will tend to push the valve away from its seating.

The present invention provides surgical or veterinary tubing adapted to be inserted into the body through an orifice, fitted with an inflatable balloon to hold it in place and of the type through which liquid or gas is passed under delicate control said tubing being provided with a one-piece valve made of resilient material and having an internal axial bore whose inner end is closed except when fluid pressure is applied to the valve to deform the resilient material and thereby open one or more apertures.

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When made of rubber-like material, the valve can be fastened very easily inside the inflation funnel of a rubber catheter, e.g., by adhesion. It preferably has a flexible extension that can be turned down over the outside of the funnel.

The valve may be made of natural or synthetic rubber, resilient flexible plastics material, e.g. polyvinyl chloride, or rubber-plastics copolymers, rubber-modified polythenes, and the like. It can be made by injection or compression moulding, preferably the latter, and it would be possible, though somewhat more difficult, to make it by dipping. The internal axial bore is preferably tapered and/or provided with a rounded end.

The valve is cheap and its operation is very simple. The valve can be used with any conventional hypodermic syringe fitting, e.g., a record mount, a Luer syringe mount, or a needle, any of which can readily be inserted into the valve. Pressure on the plunger of the syringe is transferred to the fluid which deforms the resilient material of the valve and opens the apertures, which are preferably small slits, causing liquid to be passed through the inflation tube to the balloon. The slits are preferably large enough to accommodate a conventional hypodermic needle so that, when such a needle is used, it can pass right through the slits without damaging or affecting the operation of the valve.

An embodiment of the invention contains a valve as shown in the drawing accompanying the provisional specification, which is a magnified section through a valve. The valve comprises a tapering bore 1 into which the mounting of a syringe may be inserted. The valve is inserted into inflation funnel 3 and an extension 2 of the valve is turned down to fit over the funnel 3. The bore is closed at 4, the closure being slitted at 5, no material being removed when the slit is formed. It will be realised that a record or Luer mount of a hypodermic syringe, or a hypodermic needle, are equally effective for opening the valve. When inserted, the needle will of course

pass right through slit 5 but the slit will close tightly again when the needle has been withdrawn. Annular protuberances 6 help to hold the valve in place in the inflation funnel.

#### WHAT WE CLAIM IS:—

1. Surgical or veterinary tubing adapted to be inserted into the body through an orifice, fitted with an inflatable balloon to hold it in place and of the type through which liquid or gas is passed under delicate control, said tubing being provided with a one-piece valve made of resilient material and having an internal axial bore whose inner end is closed except when fluid pressure is applied to the valve to deform the resilient material and thereby open one or more apertures.
2. Tubing as claimed in claim 1 in which the valve can be opened sufficiently to take a conventional hypodermic needle.
3. Tubing as claimed in claim 1 or 2 in which the valve is made of natural or synthetic rubber or resilient flexible plastics material.
4. Tubing as claimed in claim 1, 2 or 3, in which the bore of the valve is tapered.
5. Tubing as claimed in any preceding claim in which the bore of the valve has a rounded end.
6. Tubing as claimed in any preceding claim in which the valve has one or more slits at the inner end of the axial bore.
7. Tubing as claimed in any preceding claim in which the valve has a flexible extension capable of being turned down over the outside of the inflation funnel of a catheter.
8. Tubing as claimed in any preceding claim in which the valve is substantially as hereinbefore described with reference to the single figure of the drawing accompanying the provisional specification.
9. Tubing as claimed in any one of claims 1—8 in the form of a catheter.

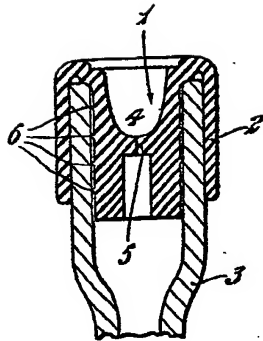
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PROVISIONAL SPECIFICATION

1 SHEET

*This drawing is a reproduction of  
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